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Thermoelectric magnetohydrodynamic (TEMHD) stirring of liquid lithium[1] M.A. JAWORSKI, WENYU XU, JASON KIM, MATT LEE, MARTIN NEUMANN, VIJAY SURLA, DAVID RUZIC, University of Illinois at Urbana-Champaign — The Solid/Liquid Lithium Divertor Experiment (SLiDE) was constructed to examine passive flows in liquid lithium under an applied heat load and external magnetic field. The offered explanation for the results of the CDX-U experiment, where liquid lithium was capable of transporting $> 50[\mathrm{MW/m^2}]$ of incident heat flux without rapid evaporation, was thermocapillary (Marangonic) driven flows. The SLiDE apparatus utilizes a line-stripe heat source and external magnetic fields to mimic a divertor scenario to test the thermocapillary hypothesis. Instead of thermocapillary induced flows, TEMHD flows are observed on the order of 10 [cm/s]. The thermoelectric effect was confirmed through a series of qualitative experiments in the apparatus which will be described. A quantitative scaling matching the measured target temperatures and heat fluxes is compared to the measured velocities. A novel plasma facing component based on porous material TEMHD is also presented.

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